

**Technical Memorandum**  
**for**  
**SA3 Contaminated Sediment**  
**Removal Operations**

**Portage Creek Area Removal**  
**Kalamazoo, Michigan**

Prepared for:

USEPA Region 5  
Emergency Response Branch  
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Chicago, IL 60604

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## 1. INTRODUCTION

Environmental Quality Management, Inc. (EQ) has been tasked with performing a time-critical-removal action (TCRA) to remove polychlorinated biphenyl (PCB) contaminated sediments from targeted locations over a 1.8-mile section of Portage Creek. The Portage Creek Area Site (Site) is a portion of the Allied Paper/Portage Creek/Kalamazoo River Superfund Site. Located in Kalamazoo County, Michigan, this site is pervasively contaminated with PCBs as a result of historic waste practices associated with several paper mills. The Site was listed on the National Priorities List (NPL) on August 30, 1990. The Portage Creek Site is located in the City of Kalamazoo, Michigan, beginning at East Cork Street and extending northward approximately 3 miles to the confluence of the Kalamazoo River. Activities associated with this removal action are anticipated to occur in segments along a 1.8-mile stretch of Portage Creek. Work activities will move downstream primarily between Reed Avenue to East Walnut Street bridge, South Pitcher Street bridge to the railroad crossing west of Rochester Street, and the bend in Portage Creek east of Rochester Street to the confluence with the Kalamazoo River (Figure 1, Site Location Map, Attachment 1).

A comprehensive description of the project is provided in the Work Plan (composed of sediment removal area technical memorandums and other site documents) for the Portage Creek Area Time-Critical Removal Action. The section of Portage Creek targeted for action has been divided into 10 distinct removal areas (Figure 2, Sediment Removal Areas, Attachment 1). The areas targeted for removal will be referred to as SA1-A, SA1-B, SA1-C, SA3-A, SA5-A, SA5-C, Axtell Creek, SA5-D, SA6, and SA7. This technical memorandum will focus on establishing support facilities and contaminated sediment removal operations in the SA3 Area. Approaches described in this technical memorandum supersede all other removal approaches discussed to date in related submittals.



## **2. PROJECT PREPARATION**

EQ will perform the following activities to prepare the Portage Creek Area Site for contaminated sediment excavation in SA3.

### **2.1 Pre-excavation Sampling of Data Gap Area SA3**

#### **2.1.1 Sampling**

EQ conducted sampling at dredging area SA3 on October 22, 2012 to further define the extent of contamination and to finalize the removal depths required. Grids A1 through A7 of SA3 were sampled to verify removal depth and extent of excavation. Analytical results of sampling did not impact work described in this Technical Memorandum.

#### **2.1.2 Analyses**

Samples were analyzed for total PCBs by ALS Global of Holland Michigan. Analyses verified that sediment contaminant levels for PCBs were below TSCA disposal limits, and would be acceptable for Subtitle D Landfill Disposal.



### 3. SA3 CONTAMINATED SEDIMENT REMOVAL

The SA3 dredging area is primarily located within a parcel of property owned by Nature Ventures that lies to the east of the Pilcher Street and extends south of Michigan Avenue. SA3 is subdivided into eight segments. Seven segments are within the creek channel and a flood plain excavation area located east of the creek along the southern side of the creek. SA3 extends north of the railroad to the northeast and is bounded by a second railroad bridge. The sediment removal depth for the entire area extends to 30 inches below the existing creek bottom, which includes an estimated 6 inches of over-dredge depth.

The overall surface area to be excavated and dredged in SA3 is anticipated to be approximately 15,722ft<sup>2</sup>. The approximate overall dimensions are 354 ft long with an average width per excavation area segment of 35.7 ft. EQ will dredge sediments that will require non-TSCA disposal at a Subtitle D Landfill (approximately 1,456 yd<sup>3</sup>). Table 3-1 presents excavation details.

**Table 1. SA3 Excavation Details**

<b>Excavation Area</b>	<b>Dimensions, ft</b>	<b>Removal Depth, in.</b>	<b>Surface Area/Volume of TSCA Soils</b>	<b>Surface Area/Volume of Subtitle D Soils</b>
SA3A-1	42' W by 46' L	30	0/00 /0	1677 ft <sup>2</sup> /155 yd <sup>3</sup>
SA3A-2	28.2' W by 46.2' L	30	0/0	1234 ft <sup>2</sup> /114.26352 yd <sup>3</sup>
SA3A-3	33' W by 128' L	30	0/0	3524 ft <sup>2</sup> /326 yd <sup>3</sup>
SA3A-4	30.5' W by 47.9' L	30	0/0	1398 ft <sup>2</sup> /129 yd <sup>3</sup>
SA3A-5	31' W by 49.7' L	30	0/0	1598 ft <sup>2</sup> /148 yd <sup>3</sup>
SA3A-6	32.7' W by 59.7' L	30	0/0	1729 ft <sup>2</sup> /160 yd <sup>3</sup>
SA3-A7	42.8' W by 50.8' L	30	0/0	2350 ft <sup>2</sup> /218 yd <sup>3</sup>
SA3-A8	41' W by 61' L	30	0/0	2212 ft <sup>2</sup> /205 yd <sup>3</sup>

#### 3.1 Pre-Sediment Removal Preparation

##### 3.1.1 Waste Characterization Sampling of TSCA/Subtitle D Soil

EQ collected characterization soil samples of the TSCA and Subtitle D soils prior to excavation during the October 2012 sampling event previously described. Sampling was performed in



compliance with the EQ FSP dated August 2011 that provided information on the number of samples, collection method, and exact analyses to be performed. The Subtitle D waste soils were analyzed for landfill disposal parameters.

### 3.1.2 Pre-Sediment Removal Condition Assessment

EQ provided a structural engineer to perform a pre-sediment removal assessment of constructed features in and adjacent to the creek channel excavation areas. Details of this assessment are provided in a report entitled “Pre-Sediment Removal Structure Feature Assessment Removal Areas SA3-A, SA3-B and SA3-Access” dated August 2012 prepared by Fleis and Vandenbrink Engineering Inc. The report identifies the following structural features in the SA3 work area. These constructed features are presented in Table 2. Table 2-3 presents the impact of the constructed features of SA3 on dredging operations.

**Table 2. SA3 Constructed Features**

<b>Report Designation</b>	<b>Location</b>	<b>Constructed Features</b>
SA3-A-01	South end of SA3 Excavation Area	<ul style="list-style-type: none"><li>• 2 railroad bridges</li><li>• 1 supplemental bridge</li><li>• 42-in. stormwater outlet (SWO)(southwest bank)</li><li>• Failed sheet pile around 42-in. SWO</li><li>• Conduit north side of bridge (failed)</li><li>• Conduit south side of bridge</li></ul>
SA3-A-02	Central region of Grid Area SA3-A3	<ul style="list-style-type: none"><li>• Timber utility pole and associated guy wires</li></ul>
SA3-A-03	Central region of SA3-A2	<ul style="list-style-type: none"><li>• Concrete slabs used as rip-rap for bank stabilization</li></ul>
SA3-A-04	North end of SA3-A7 and south end of SA3-A8	<ul style="list-style-type: none"><li>• Abandoned railroad bridge</li></ul>
SA3-A-05	North end of SA3-08	<ul style="list-style-type: none"><li>• Railroad bridge with concrete abutments and timber railing</li></ul>

**Table 3. SA3 Impact of Constructed Features on Dredging Operations**

Constructed Feature	Designation	Impact/Protective Measure
<ul style="list-style-type: none"><li>• Railroad bridges</li><li>• 42-in. stormwater outlet</li><li>• Failed sheet pile around 42-in. SWO</li><li>• Conduit north side of bridge</li><li>• Conduit south side of bridge</li></ul>	SA3-A-01	<ul style="list-style-type: none"><li>• Locate sheet pile cofferdam a minimum of 6 ft downstream of bridge and outside of railroad easement.</li><li>• Sandbag re-enforcement around outlet and sheet pile shall be installed to stabilize area during isolation and by-pass pumping operations.</li><li>• Maintain safe work distance from conduits; sandbag protective barrier around north conduit to protect from sheet pile installation and bypass pumping operations.</li></ul>
<ul style="list-style-type: none"><li>• Timber utility pole and associated guy wires</li></ul>	SA3-A-02	<ul style="list-style-type: none"><li>• Further inspection on west side of creek has determined that utility line suspended on pole is severed and presumed abandoned; therefore, pole and guy wires will be removed.</li></ul>
<ul style="list-style-type: none"><li>• Concrete slabs bank stabilization</li></ul>	SA3-A-03	<ul style="list-style-type: none"><li>• Concrete debris will be removed and disposed of as needed to facilitate bank restoration and stabilization.</li></ul>
<ul style="list-style-type: none"><li>• Abandoned railroad bridge</li></ul>	SA3-A-04	<ul style="list-style-type: none"><li>• Excavation will be restricted to within 6 ft of bridge structure.</li><li>• Bridge will be utilized to route bypass pumping discharge lines from east side of creek to west side of creek prior to final discharge.</li></ul>
<ul style="list-style-type: none"><li>• Railroad bridge</li></ul>	SA3-A-05	<ul style="list-style-type: none"><li>• Downstream isolation dam will be installed a minimum of 6 ft upstream of downstream railroad bridge and outside of railroad easement.</li></ul>

### 3.1.3 Clearing and Grubbing of Access Road and Excavation Area

Clearing and grubbing may be very minimal to very extensive subject to the vegetative cover that will restrict access to the dredging areas. EQ will first clear and grub the access road route back to the excavation area. This will extend from an access point off of Michigan Avenue just east of the intersection with Pitcher Street. Clearing and grubbing of the access road route will consist of bush-hog mowing a 30-ft-wide path southeast from Michigan Avenue through the former railroad switching yard to just north of the excavation area. The area will be widened just north of the excavation area to accommodate the support area, staging pad, and the access road around it. The proposed extent of clearing and grubbing is depicted in Attachment 1 Figure 3, Extent of Clearing and Grubbing.



EQ will clear and grub the entire western bank of the creek channel along the length of SA3 to facilitate dredging. The eastern bank and flood plain will be cleared to facilitate excavation of the flood plain and installation of the bypass pump discharge pipeline. EQ intends to perform all clearing and grubbing in such a manner to protect the root mass in the overall work area to maintain soil stability.

Tree tops and tree trunks will be handled as described in the EQ Debris Management Plan dated September 2011.

### **3.1.4 Environmental Controls**

EQ will install environmental controls per requirements established in the EQ Sedimentation and Erosion Control Plan dated September 2011. These environmental controls will include the following Best Management Practices (BMPs):

- **Storm Drain Inlet Protection**—EQ will install filtration fabric in storm drain inlets that are potentially impacted by site operations.
- **Construction Exits**—EQ will install a construction entrance just south of Michigan Avenue as depicted in Attachment 1 Figure 4. Installed construction exits will either consist of an 8-ounce geotextile underlayment with a 6-inch-thick layer of 1- to 3-inch rock or HDPE construction mats or prefabricated steel rumble strips placed over liner material. The construction exits will be approximately 15 ft wide.
- **Tire Wash Station**—EQ will install and operate a tire wash station(s) just prior to the entrance for the construction exits described above. The tire wash station will consist of a steel box with a steel-grate cover suitable for supporting loaded dump trucks. After each truck is loaded with exhumed sediment, laborer(s) equipped with high-pressure water washer(s) will spray off the dirt from truck tires as they pass through the tire wash station prior to exiting the site. The dislodged dirt and water will be captured in the steel box containment. Wash waters will periodically be pumped or trucked to the waste water treatment plant to maintain suitable storage capacity. Additional periodic maintenance will be required to remove sediment accumulations, which will be solidified and loaded into transfer trucks to be shipped to the John Street TCRA staging pad.
- **Paved Surface Management**—EQ will provide a power broom with a water tank to perform housekeeping of the paved work areas.
- **Dust Control**—EQ will provide a water truck for dust control for the mixing area and truck route.
- **Fuel Station**—EQ will fuel the heavy equipment in the support area depicted in Attachment 1, Figure 4, Site Infrastructure. A temporary fuel tank with secondary containment will be stationed at this location. Additional fuel tanks with secondary containment will be stationed adjacent to the Bypass location and Vacuum Dewatering Pump location. EQ will also



provide emergency spill control kits that will include drums, oil dry, adsorbent pads, and a boom to address small spills that will be staged adjacent to the designated fueling area.

- **Sediment Curtain**—EQ will install one or more Type II sediment curtains downstream of sediment removal operations perpendicular to the stream flow. Additional curtain(s) will be installed downstream of the cofferdams and bypass pumping discharge pads.
- **Silt Fence**—EQ will install a silt fence at the bottom of the slopes along both sides of the creek subsequent to completion of excavation activities to stabilize sediments until vegetation is re-established.
- **Mulch Blanket**—EQ will install additional mulch blanket as needed.
- **Rock Discharge Box(es)**—When EQ isolates an excavation area, bypass pumping will be required to maintain creek flow. EQ will isolate the entire SA3 dredging area with one upstream and one downstream coffer dam. Therefore, EQ will install one or more rock discharge boxes downstream of each isolated section through which the discharge lines of the various bypass pumps will be directed to release their water. The rock discharge box will consist of four to five 3-ft by 3-ft by 6-ft gabion boxes filled with rip-rap stone to dissipate discharge velocity.
- **Turbidity Monitoring Station**—EQ will establish turbidity monitoring station(s) to monitor the turbidity levels during removal operations. Real-time turbidity monitoring will be performed with stations set 300 ft upstream, 200 ft downstream, and 300 ft downstream of cofferdams set at each area. Turbidity monitoring will be recorded on half-hour intervals by a programmed data logger at the turbidity station. Other readings may be collected based on field conditions such as presence of visible runoff to the creek in the work vicinity, or as part of mitigation measures. Data will be transferred to a computer in the EQ command post trailer via a cellular modem. Further details concerning turbidity monitoring and corrective action measures are presented in EQ's Field Sampling Plan for Portage Creek Removal Area dated August 2011.

Additional environmental controls will be implemented as needed to supplement pre-construction controls as work progresses and site features are impacted by the sediment remediation activities.

### **3.1.5 Access Road Construction**

EQ may only need to make minimal improvements to construct the access road back to SA3 from Michigan Avenue. Because the route will traverse over a vegetated railyard, clearing and grubbing of the route should comprise the bulk of the work. Additional improvements may include placing geotextile and stone over areas of concern where wet and soft conditions may exist.



### **3.1.6 Dredging Area Isolation**

EQ will install two sheet pile cofferdams to isolate the dredging areas and facilitate dewatering to permit “dredging-in-the-dry” of the contaminated sediments. The location of the coffer dams is depicted in Attachment 1, Figure 4, Site Infrastructure.

EQ may modify this approach once the dredging activity has started if groundwater recharge conditions exceed wastewater treatment system capacity.

These cofferdams will be completed to an elevation approximately 6 inches above the average creek water level elevation. The elevation completion height has been specified by USEPA to allow storm water overflow into the isolated excavation area in the event of bypass pumping failure and/or a storm event to prevent upstream flooding due to sediment removal operations.

### **3.1.7 Bypass Pumping**

EQ will provide a dewatering subcontractor to perform bypass pumping operations and isolated dredging area dewatering. Bypass pumping will consist of rerouting creek channel flow around the isolated dredging area and discharging it back into the creek below the downstream isolation cofferdam.

Creek channel bypass pumping will consist of capturing the stream flow from the creek from above the upstream isolation cofferdam and pumping it past the downstream isolation cofferdam and discharging captured creek waters on a rock discharge pad installed by EQ. Bypass pumping capacity will be specified to exceed 2 times the average creek flow of approximately 45 cfm.

The subcontractor will also be required to provide redundant pumps and ancillary equipment to allow for maintenance of the pumping systems without impacting dredging operations. There may be exceptions to this specification during bypass pumping around isolated areas where suitable work space is unavailable to operate multiple 24-inch discharge lines for redundant pumping systems. Bypass pumping operations will be described in the subsequent water management subsection. The by-pass pumping systems will be installed concurrently with installation of the upstream/downstream isolation cofferdam. Attachment 1, Figure 4, Site Infrastructure, depicts the location of the bypass pumps and discharge piping.



### **3.1.8 Dredging Area Dewatering**

EQ will provide a dewatering subcontractor to perform isolated dredging area dewatering. The subcontractor will install a series of 1-inch sipper wells using an excavator with a jetting probe. The sipper wells will consist of 1-inch tubes covered by a geotextile sleeve jetted to an approximate depth of 10 feet below the creek bottom surface elevation. Tubing will connect the sipper wells through a valve control box at 100-foot intervals that will be connected to a manifold pipe. The manifold pipe will be connected to a vacuum pump that discharges into the 10-inch pipeline that transfers recovered water to the waste water treatment plant. A vacuum will be placed on the sipper wells to extract water from the sediment. Several days of pumping will be permitted prior to the start of dredging to remove the maximum amount of moisture from the sediments prior to dredging. This will facilitate sediment removal with minimal solidification at the removal area. Minimizing water content in sediment has the following benefits:

- Requires less solidification material, thus lowering the purchase cost of solidification material.
- Decreases water weight in sediment, thus reducing disposal cost by reducing disposal tonnage.
- Decreases volume of solidification material, thus decreasing waste volume and tonnage disposal costs.
- Reduced use of solidification material reduces dust control issues associated with solidification.

The end result is a cost and safety benefit. Attachment1, Figure 5, Typical Water Management Pumping, depicts the general configuration of groundwater depression wells and isolation area dewatering sipper wells.

### **3.1.9 Pre-Excavation Topographic Survey**

EQ will coordinate with the EPA FIELDS Group to perform a pre-excavation survey of the removal area to fill in data gaps not captured when surveying the transect lines. This survey data will be used for multiple purposes. First, it will document the pre-removal topographical condition of the creek channel. This serves as a baseline to measure the performance of contaminated sediment removal and creek channel stabilization/backfill activities. To accomplish this, the survey data will then be loaded into the Real-Time Kinetics–Global



Positioning System (RTK-GPS) equipment mounted in the excavators used for dredging to guide excavation/backfill efforts and ensure the lateral/vertical extent of contaminated sediment removal and backfill restoration is performed correctly.

### **3.1.10 Abandoned Railroad Trestle Demolition**

The abandoned railroad trestle that crosses the creek through excavation Grids SA3 A-7 and A-8 will be demolished to facilitate contaminated sediment removal. EQ will utilize on-site heavy equipment to demolish and remove the structure. Support piers will either be completely extracted or removed to 3 ft below existing grade. Recovered steel will be recycled as scrap ferris metal, and remaining debris will be disposed of at the Subtitle D Landfill. Debris and scrap steel will be processed as needed to facilitate disposal and/or recycling.

## **3.2 Contaminated Sediment Removal**

Sediment removal will be removed in two phases to complete flood plain and creek channel excavation. Sediment removal will begin in SA3-3A within the flood plain area east of the creek channel. This will require multiple handling steps for completion. The long-reach excavator will excavate the flood plain area from south to north and place exhumed soils into the isolated dewatered creek channel. A second excavator working from the west bank will remove these soils and place them into off-road dump truck(s) for transfer to the staging pad for subsequent shipment off site.

Sediment in the creek channel (SA3-A1-A2, SA3-A4-A7) will be removed from the top of the bank with a long-reach excavator equipped with RTK-GPS equipment. Bypass pumping will be performed to maintain creek flow and storm water drainage. Sediments will be solidified sufficiently in place to allow transfer dumptrucks to move material to the temporary staging pad for final dewatering/solidification and subsequent shipment for disposal. Exhumed material will be directly loaded and shipped from the staging pad to the disposal facility. Post-removal sampling and surveying will be performed to verify that cleanup objectives have been met. Once isolated removal area objectives have been meet, toe of bank stabilization and backfilling will be conducted along with survey verification.



### **3.2.1 Water Management**

Bypass pumping operations will begin after completion of the dredging area isolation and installation of the bypass pumping systems. Bypass pumping will operate 24 hours per day 7 days per week until the isolated dredging area is dredged, the area is confirmatory surveyed/sampled, toe of bank stabilization is completed, and the area is backfilled. Bypass pumping will be terminated during rain and associated flooding events that exceed pumping capacity, and creek flow will be permitted to enter the isolated dredging area; bypass pumping will resume subsequent to flood crest. The discharge of bypass pumping waters will not require a Substantial Requirements Document (SRD).

Next, the isolation area dewatering pumping system will be operated 24 hours/day 7 days/week until the isolated dredging area is dredged, the area is confirmatory surveyed/sampled, bank stabilization is completed, and the area is backfilled. Isolation area dewatering will be stopped during rain and associated flooding events that exceed pumping capacity, and the creek flow will be permitted to enter the isolated dredging area. Dewatering will resume after the flood crests.

### **3.2.2 Dredging of SA3**

#### **3.2.2.1 Sediment Removal**

As previously stated, sediment removal in the SA 3 removal area will begin in the SA3 A-3 flood plain. Excavation will begin in the south end of the flood plain by removing soil from east to west and depositing material in the dewatered creek channel where a second excavator will add solidification agent, if needed, using established methods and protocols. The second excavator will load material into an off-road dumptruck (ORDTs) for transfer to the temporary staging pad for subsequent disposal shipment. Excavation will proceed to the north in this manner to the northern extent of SA3 A-3.

EQ will then dredge contaminated sediments from the isolated Grid SA3-A1-A2, and SA3-A4-A7 Grid Areas using a top-of-bank dredging approach subsequent to surface dewatering the isolated sections. Dredging will initially be performed in isolated section Grid Areas SA3-A1 through A2, and SA3- A4 through SA3-A8. EQ will dredge the isolated areas from atop the eastern bank by using a long-reach excavator equipped with a RTK-GPS. EQ will solidify



sediments in the creek bed or in solidification boxes (as/if needed) to prepare them for transfer to the temporary Staging Pad. EQ may use one or a combination of three solidification materials that include Calciment®, crystallized polymer, and/or corn cob grit. If and when a solidification box is used, EQ will place the material into a sediment solidification box that will be pumped free of latent water before solidification. Water will be pumped into a holding tank to allow sediment to settle. Accumulated water from the holding tank will be periodically pumped into the 10-inch transfer pipeline to the John Street TCRA (WWTP). The long-reach excavator will use a smooth-edge bucket to exhume sediments to the target depth for the individual grid area being exhumed, clearing sediment from the west bank to the east bank as removal progresses to the north in a downstream direction. Once sediments are sufficiently solidified, the excavator operator will load transfer dumptrucks, and material will be sent to the temporary Staging Pad.

#### **3.2.2.2 Contaminated Sediment Removal and Transfer to Staging Area**

ORDTs will advance to the respective isolation area for loading and will deposit their load on the temporary staging pad. ORDTs will back up an approach ramp to the staging pad, and will raise their dump bed after cresting the top of the berm. Heavy equipment on the staging pad will remove material from the dump area to ensure ORDTs are not tracking into dumped sediments. ORDTs will then return to isolation areas for continued loading. The load-out area at the creek side will be covered with plastic sheeting draped back into the active excavation area to allow for containment and recovery of spillage from loading operations. Excavator operators will take special care during loading so as to not spill sediment.

#### **3.2.2.3 Post-Excavation Sampling**

EQ will support the START contractor in post-excavation sampling of the contaminated soil removal area following the methods and procedures described in the confirmation sediment collection sampling described in the FSP. EQ will provide laboratory analyses through a competitively procured laboratory. Sampling and analyses will be performed in accordance with the QAPP and FSP prepared by EQ for the site dated September 2011 and August 2011, respectively. Sampling locations will be marked in order to document locations during post-excavation survey operations. Turnaround time for sample analyses will be determined at/or near the time of collection subject to time constraints with other site operations. If cleanup



performance standards/goals are met in all areas of contaminated soil removal, work will proceed to close out the excavation. If a portion of any area and/or all areas fail to meet performance standards/goals, an additional 6 inches will be excavated and the area re-sampled. The sampling and excavation process will be repeated as needed (or as directed by the EPA OSC) until the entire excavation area meets cleanup performance standards/goals before excavation closeout activities are begun.

#### **3.2.2.4 Post-Excavation Survey**

EQ will coordinate with the EPA OSC and EPA FIELDS Group to conduct post-excavation surveying as described in the post-excavation surveying of SA3, and EQ will prepare as-built drawings and make required volume removal calculations.

#### **3.2.2.5 Toe of Bank Restoration**

Toe of banks will be restored as described in EQ's Restoration Plan dated September 2011.

#### **3.2.2.6 Backfill of Creek Bottom**

Subsequent to toe of bank restoration (if required), EQ will begin deploying a sand and gravel mix (bank run) to backfill the creek bottom in accordance with EQ's Restoration Plan dated September 2011.

#### **3.2.2.7 Post Backfill Survey**

EQ will coordinate with the EPA OSC and EPA FIELDS Group to conduct post-excavation surveying of SA3 grids subsequent to successful removal of contaminated soil to cleanup performance standards/goals. The EPA FIELDS Group will perform post-excavation surveying to document removal depths. The EPA FIELDS Group will provide survey data to EQ to generate as-built drawings and make cut-to-fill calculations to determine the volume of contaminated soil removed.



### **3.2.3 Site Restoration**

#### **3.2.3.1 Removal of Excavation Facilities and Equipment**

EQ will remove non-essential facilities and equipment from the work area to restore the site to pre-existing conditions. The fuel tank, excavation equipment, tire wash station, cofferdams, pumps, pipelines, etc., will be removed.

#### **3.2.3.2 Restoration Planting**

EQ will perform restoration planting as described in EQ's Restoration Plan dated September 2011. The final restoration design plan will include stakeholder input accepted by EPA and directed to EQ.

#### **3.2.3.3 Restoration Planting Monitoring**

EQ will provide monitoring and corrective action/maintenance for a period of 1 year from the restorative planting date or as directed by EPA in accordance with EQ's Restoration Plan dated September 2011. EQ will also maintain erosion sediment controls until re-vegetation planting is accepted or as directed by EPA.

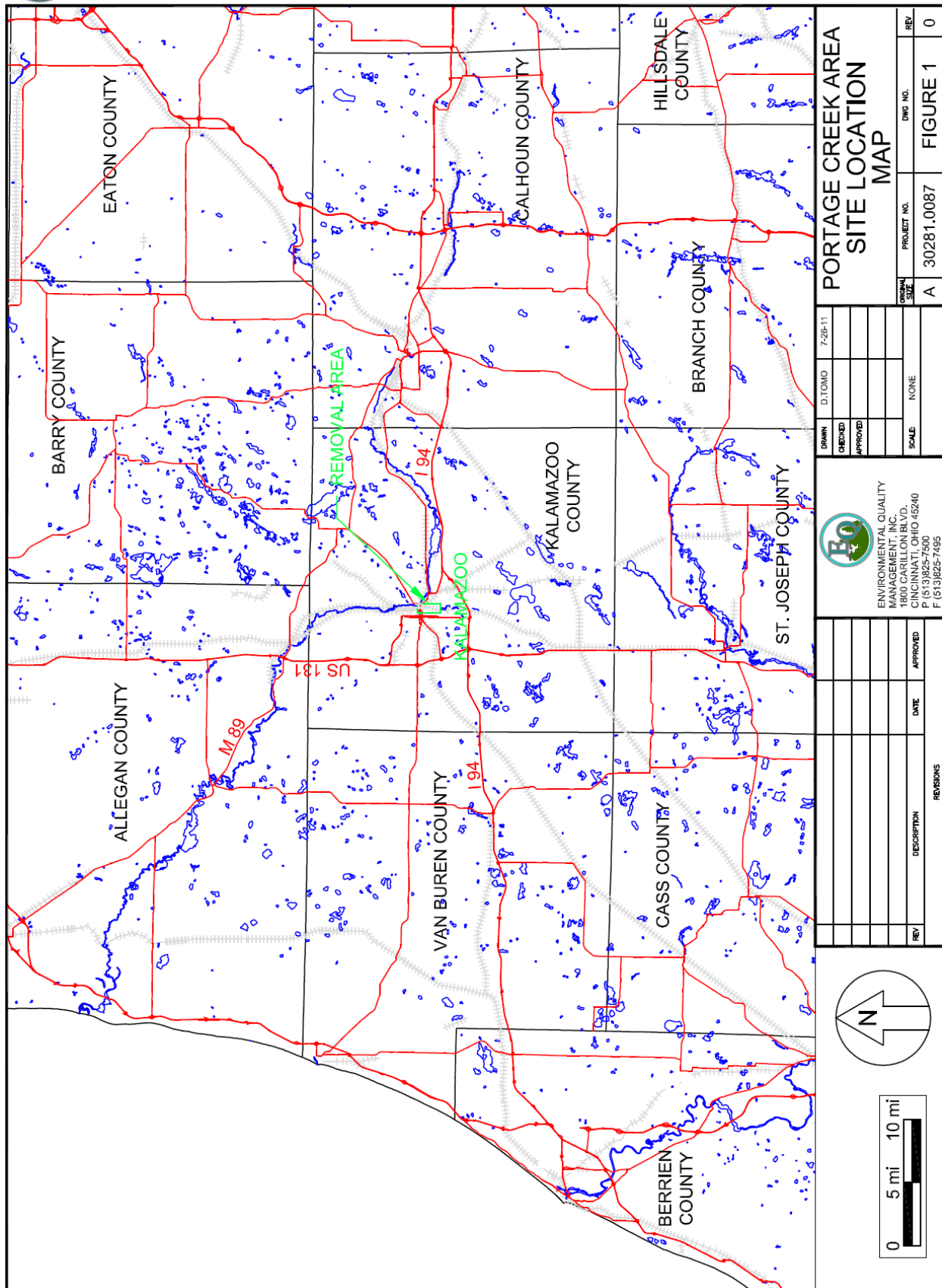
#### **3.2.3.4 Facility Impact Repair**

EQ will make repairs to the sediment removal sites caused by sediment removal operations. EQ, EPA, and the appropriate property owner stakeholder will review pre-existing photo-documentation to develop a punchlist of any necessary repair items to be addressed prior to complete demobilization from the SA3 contaminated sediment removal area. EQ anticipates (at a minimum) that this will include perimeter fence repair/replacement, lawn repair and landscaping of disturbed areas, asphalt/concrete patching, and general housekeeping.



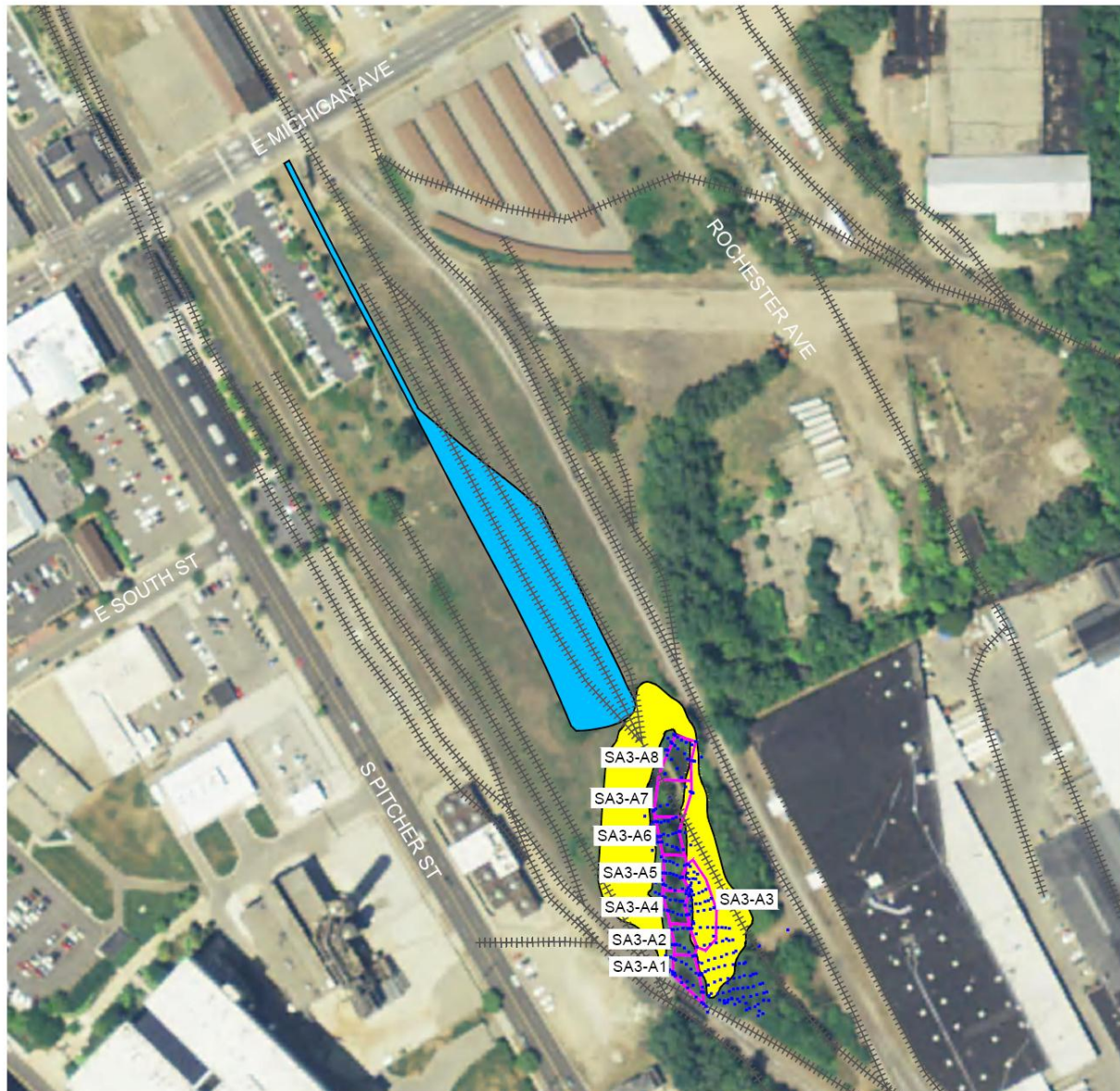
## **ATTACHMENT 1**

### **FIGURES**





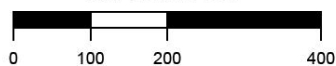
				 ENVIRONMENTAL QUALITY MANAGEMENT, INC. 1800 CARILLON BLVD. CINCINNATI, OHIO 45240 P (513)825-7500 F (513)825-7495	DRAWN	D.TOMO	7-25-11	PORTAGE CREEK AREA SEDIMENT REMOVAL AREAS			
					CHECKED						
					APPROVED						
								ORIGINAL SIZE	PROJECT NO.	DWG NO.	REV
REV	DESCRIPTION	DATE	APPROVED			SCALE	NONE	A	30281.0087	FIGURE 2	0
REVISIONS											



**LEGEND**

- ELEVATION SURVEY LOCATIONS
- WATERS EDGE EXCAVATION AREAS
- EXTENT OF CLEARING & GRUBBING (TREE & SHRUB REMOVAL)
- EXTENT OF BUSH HOG MOWING

SCALE IN FEET



REV	DESCRIPTION	DATE	APPROVED
REVISIONS			



DRAWN	R. RUSSELL	12-06-2012
CHECKED	E. BOWMAN	12-07-2012
APPROVED	E. BOWMAN	12-07-2012
SCALE:	1" = 200'	

ALLIED PORTAGE CREEK AREA SA3 (SA3-A1 THRU SA3-A8) CLEARING AND GRUBBING			
SIZE	PROJECT NO.	DWG NO.	REV
A	030281.0087	FIGURE 3	0



**LEGEND**

- |               |                                |
|---------------|--------------------------------|
| — COFFER DAM  | ■ TIRE WASH STATION            |
| — HAUL ROAD   | □ BY-PASS PUMP                 |
| ○ FUEL TANK   | — BY-PASS PUMP DISCHARGE LINE  |
| ■ STAGING PAD | ■ CONSTRUCTION ENTRANCE / EXIT |



SCALE IN FEET

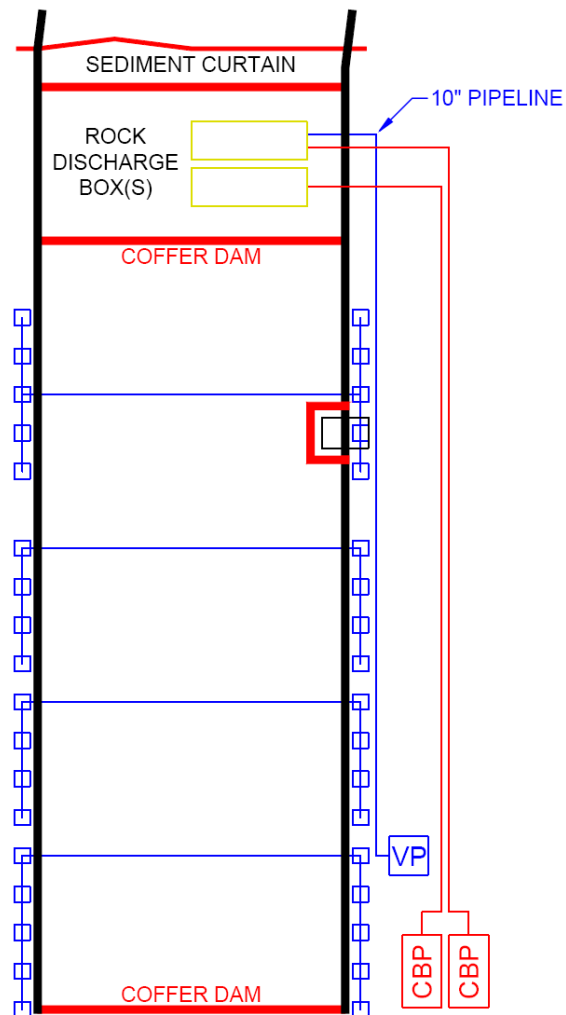


REV	DESCRIPTION	DATE	APPROVED
REVISIONS			




DRAWN	R. RUSSELL	12-06-2012
CHECKED	E. BOWMAN	12-07-2012
APPROVED	E. BOWMAN	12-07-2012
SCALE:	1" = 200'	

ALLIED PORTAGE CREEK AREA SA3 (SA3-A1 THRU SA3-A8) SITE INFRASTRUCTURE			
SIZE	PROJECT NO.	DWG NO.	REV
A	030281.0087	FIGURE 4	0

LEGEND

- 1" VACUUM EXTRACTION DEWATERING WELLS ON 5' CENTERS  
CBP CREEK BY-PASS DISCHARGE PUMPS TO ROCK DISCHARGE BOX  
VP VACUUM PUMP DISCHARGE TO 10" PIPELINE

				 ENVIRONMENTAL QUALITY MANAGEMENT, INC. 1800 CARILLON BLVD., CINCINNATI, OHIO 45240 PHONE 513.825.7500   FAX 513.825.7495 WWW.EQM.COM	DRAWN	R. RUSSELL	12-06-2012	ALLIED PORTAGE CREEK AREA SA3 (SA3-A1 THRU SA3-A8) TYPICAL WATER MANAGEMENT PUMPING				
					CHECKED	E. BOWMAN	12-07-2012					
					APPROVED	E. BOWMAN	12-07-2012					
REV	DESCRIPTION	DATE	APPROVED		SCALE:	NOT TO SCALE			SIZE	PROJECT NO.	DWG NO.	REV
	REVISIONS								A	030281.0087	FIGURE 5	0